

**ABSTRACT**

To provide a data transmission method and an apparatus thereof in a relay transmission type radio network capable of selecting an appropriate down-link relay route according to a location of a terminal station. A first relay node having received an up-link ACK packet transmitted by the terminal station transmits to a second relay node the up-link ACK packet including a source terminal station ID and a relay source node ID representing its own node ID. The second relay node having received the up-link ACK packet registers information on a pair of the source terminal station ID and the relay source node ID with a relay node list, and selects an appropriate route of a down-link packet addressed to the terminal station by using the information registered with the relay node list.